

PHILIPPINE ZOOLOGICAL EXPEDITION  
1946-1947

ON SOME PARASITIC LAELAPTOID MITES  
(ACARINA) OF THE PHILIPPINES

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Little is known about the parasitic mites of the Far East, especially of the Philippines. Only one species, *Haemolaelaps bibbyi* Strandtmann and Hunt (1950), has been reported from this area.

This preliminary study, which considers 17 species, is based upon material collected by the Chicago Natural History Museum Philippine Zoological Expedition (1946-47). Descriptions and illustrations of all species are presented. The classification adopted in this study is that of Strandtmann and Wharton (1958). The holotypes and paratypes of the new species described, unless otherwise stated, are deposited in Chicago Natural History Museum.

This study was conducted in the Entomology Research Division, United States Department of Agriculture, Washington, D.C., as a part of the training program sponsored by the International Cooperation Administration (United States Government). I am grateful to Dr. E. W. Baker, of the Entomology Research Division, for the opportunity to study specimens lent to him from the Chicago Natural History Museum collection, and for his taxonomic advice and valuable suggestions concerning the manuscript.

Family LAELAPTIDAE Berlese, 1892

Genus *Laelaps* Koch, 1836

*Laelaps nuttalli* Hirst. Figure 26, A-C.

*Laelaps nuttalli* Hirst, 1915, Bull. Ent. Res., 6: 183 (female, male, ex *Mus rattus*, *M. norvegicus*; Ceylon; illus.).

Library of Congress Catalog Card Number: 60-53628

The female of this species is distinct in that the metapodal plates are small, elongate bean-shaped; the distance between the epigynal setae IV is greater than the distance between setae I; the adanal setae are located laterad to the posterior margin of the anal opening and barely reach the base of the postanal seta; the peritreme extends to

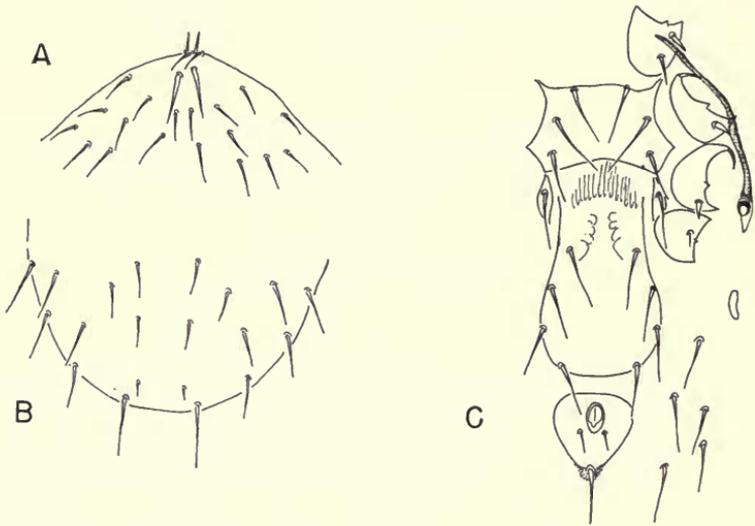


FIG. 26. *Laelaps nuttalli*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

the middle of coxa I; the distal setae on coxa I are spinelike, and coxae II and III have spinelike setae (though one specimen in the series differs in having the setae on coxae I and II not spinelike).

*Specimens examined*.—Mindanao: Tagum, Davao, October 12, 1946 (H. Hoogstraal), 2 females, ex *Rattus mindanensis*.—Palawan: Calamianes Group, Siuk, Culion Island, April 7, 1947 (M. Celestino), 10 females, ex *Sciurus culionensis* Sanborn.—Visayas: Basey, Samar, September, 1945, June 29, 1945 (F. F. Bibby), 4 females, ex *Rattus norvegicus*.—Mindoro: April 27, 1945 (W. K. Clark), 2 females, ex *Rattus rattus*; April 30, 1945 (W. Howe), female, ex *Rattus vigoratus*.

*Laelaps spinigera*, new species. Figure 27, A–C.

This species is readily distinguished from other *Laelaps* species in possessing strong, recurved spines on femur, tibia and tarsus of leg I, and a thumblike distal seta on coxa I. The posterior margin of the

sternal plate is nearly straight, and the anal plate almost touches the epigynial plate.

**FEMALE:** Gnathosomal setae stronger than hypostomal setae; chelae toothed; pilus dentilis slender with bent, knobbed apex. Dorsal plate  $504\ \mu$  long,  $307\ \mu$  wide; two pairs of short, subequal vertical setae; strong and long, subequal medial and

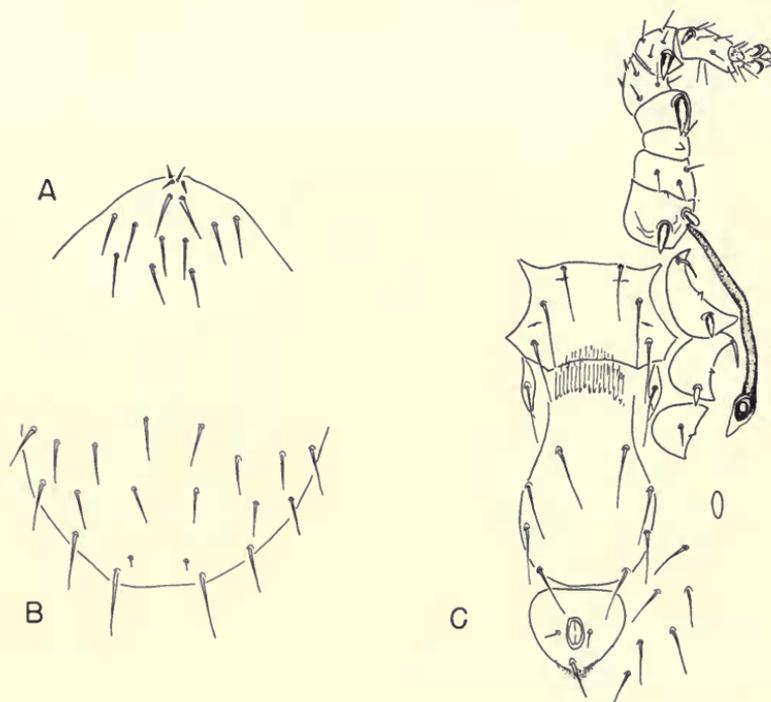


FIG. 27. *Laelaps spinigera*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

marginal setae, and a pair of much reduced submarginal setae. Sternal plate wider than long, posterior margin nearly straight; sternal and metasternal setae short, subequal in length. Epigynial plate drop-shaped, posterior margin rounded; the distance between setae IV greater than the distance between setae I. Anal plate about as long as wide, almost touching the epigynial plate; adanal setae located on midline of anal opening, not longer than anal opening; postanal seta twice as long as adanal setae. Metapodal plates elongate oval, about twice as long as wide. Venter with 6 pairs of moderately strong, short setae adjacent to epigynial and anal plates. Peritreme reaching posterior margin of coxa I. Leg I with strong, recurved spines on femur, tibia and tarsus. Distal setae on coxa I thumblike, the proximal ones strong, spinelike; proximal setae on coxae II and III spinelike.

**MALE:** Unknown.

*Holotype*.—Female, ex *Rattus panglima* Robinson. Puerto Princesa, Palawan, April 10, 1947 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Paratypes*.—Eight females, same data as holotype. One in the United States National Museum collection.

*Laelaps dispar*, new species. Figure 28, A–C.

The moderately expanded epigynial plate, which is widely separated from the anal plate, the short peritreme, which does not reach

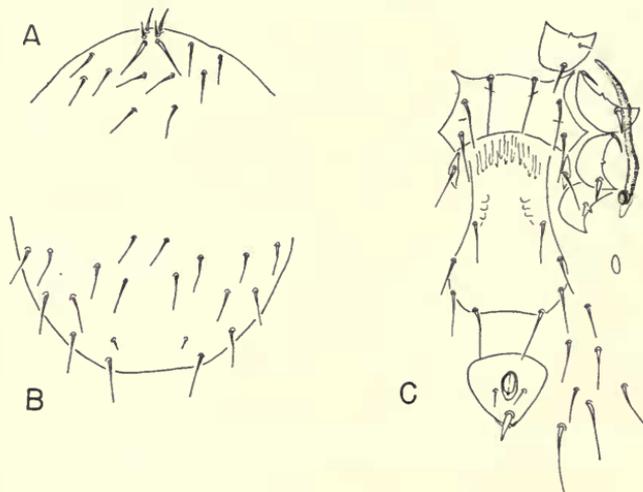


FIG. 28. *Laelaps dispar*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

coxa I, and the long and slender proximal setae on coxa I will readily serve to distinguish this species.

**FEMALE:** Gnathosoma with medial hypostomal setae slightly longer than lateral and gnathosomal setae; chelae toothed; pilus dentilis club-shaped, knobbed apically. Dorsal plate 402  $\mu$  long, 306  $\mu$  wide; second pair of vertical setae short, small; medial and marginal setae long, subequal in length, and posterior submarginal setae tiny. Sternal plate much wider than long, posterior margin concave; first pair of sternal setae reaching posterior margin of plate. Epigynial plate moderately expanded, the posterior margin about straight; the distance between setae IV the same as the distance between setae I. Anal plate wider than long, widely separated from the epigynial plate; adanal setae laterad to anal opening, short, not reaching base of postanal seta. Venter with 7 pairs of setae adjacent to epigynial and anal plates. Peritreme not reaching coxa I. Proximal setae of coxa I not spinelike, twice as long as distal setae; coxae II and III with spinelike setae.

**MALE:** Unknown.

*Holotype*.—Female, ex *Apomys insignis insignis*. Mindanao: Eastern slope of Mount McKinley, 5500 ft. elevation, August 20, 1946 (H. Hoogstraal). In the Chicago Natural History Museum collection.

***Laelaps hirtus*, new species.** Figure 29, A–C.

The distinguishing characters of this species are as follows: The distal and proximal setae on coxae I, II and III are long and slender; the distance between the epigynial setae IV is greater than the distance between setae I; the second pair of vertical setae is tiny, and there is a pair of long, posterior, marginal dorsal setae.

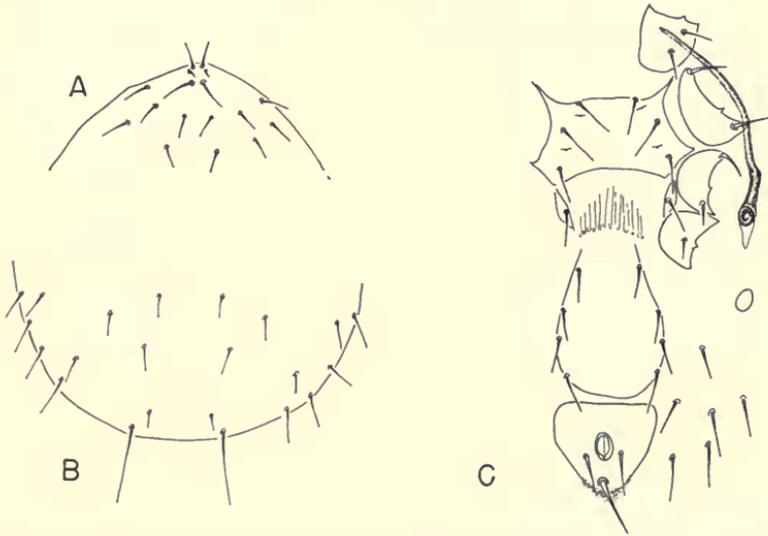


FIG. 29. *Laelaps hirtus*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

**FEMALE:** Gnathosoma with medial hypostomal setae longer than lateral and gnathosomal setae; chelae toothed; pilus dentilis slender, with bent knobbed apex. Dorsal plate 575  $\mu$  long, 383  $\mu$  wide; second pair of vertical setae tiny, medial setae shorter than marginal setae, and a pair of much longer posterior marginal setae. Sternal plate wider than long, the posterior margin concave; sternal and metasternal setae short, subequal in length. Epigynial plate drop-shaped, rounded posteriorly; the distance between setae IV greater than the distance between setae I. Anal plate wider than long, almost as wide as and closely separated from epigynial plate; adanal setae reaching base of postanal seta. Metapodal plates small, rounded. Venter with 6 pairs of moderately long setae laterad to epigynial and anal plates. Peritreme extending beyond middle of coxa I. Both distal and proximal setae of coxae I, II and III long and slender, not spinelike.

**MALE:** Unknown.

*Holotype*.—Female, ex *Rattus bagopus*. Mindanao: Mount McKinley, 3100 ft. elevation, Davao, August 19, 1946 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Laelaps nobilis*, new species. Figure 30, A–C.

The short medial setae, the wide, inverted V-shaped posterior margin of the sternal plate, the long, slender setae on coxa II, and

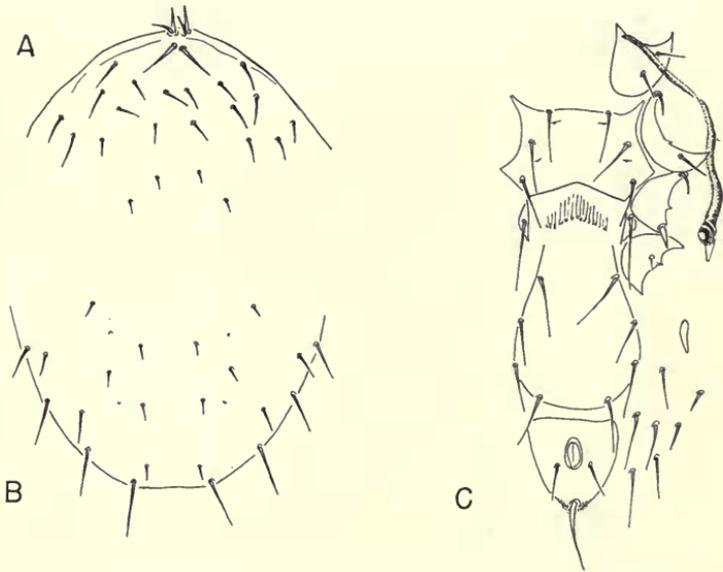


FIG. 30. *Laelaps nobilis*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

the club-shaped metapodal plates are the distinctive features of this species.

**FEMALE:** Gnathosoma with posterior medial hypostomal setae three times longer than lateral setae; chelae toothed; pilus dentilis inflated at middle, knobbed apically. Dorsal plate 658  $\mu$  long, 396  $\mu$  wide; two pairs of vertical setae strong, moderately long, subequal; medial setae weak and short; posterior submarginal setae subequal to medial setae. Sternal plate wider than long with a wide, inverted V-shaped posterior margin; sternal setae shorter than metasternal setae. Epigynal plate drop-shaped, rounded posteriorly; the distance between setae I approximately the same as the distance between setae IV. Anal plate about as long as wide, moderately separated from epigynal plate; adanal setae on level of posterior margin of anal opening and reaching base of postanal seta. Metapodal plates small, club-shaped. Venter with 7 pairs of strong spinelike setae laterad to epigynal and anal plates. Peritreme reaching beyond middle of coxa I. Proximal setae of coxae I and II long and slender, not spinelike, of coxa III spinelike.

MALE: Unknown, though four males were found on the same host and are so labeled.

*Holotype*.—Female, ex *Rattus everetti*. Mindanao: Mount Apo, 6400 ft. elevation, Davao, November 8, 1946 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Paratypes*.—Three females, same data as holotype. One in the United States National Museum collection.

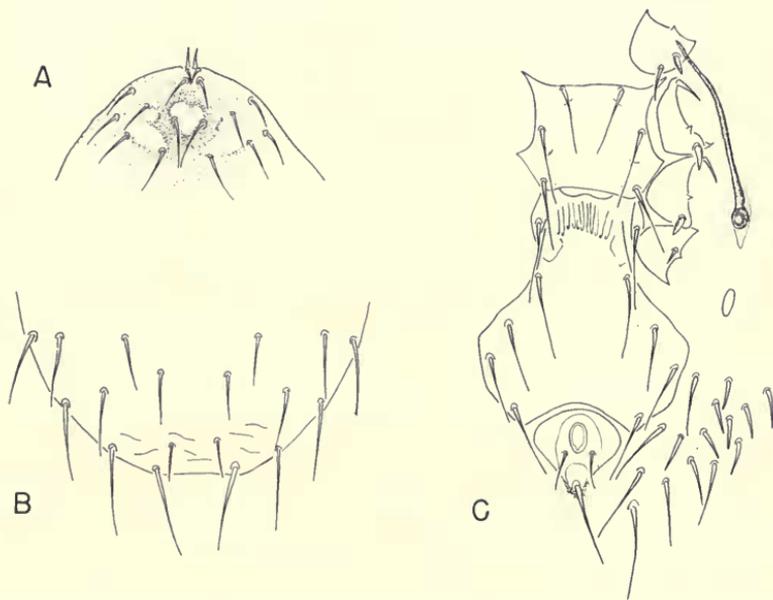


FIG. 31. *Echinolaelaps echidninus*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

### Genus ECHINOLAEALAPS Ewing, 1929

*Echinolaelaps echidninus* (Berlese). Figure 31, A–C.

*Laelaps (Iphis) echidninus* Berlese, 1887, *Acari Myriapoda et Scorpioncs*, fasc. 39, nr. 1, t. 50, figs. 1–4.

*Laelaps (Laelaps) echidninus* Berlese, 1887, *Vitzthum*, 1926, *Treubia*, 8: 56 (female, ex *Paradoxurus hermaphroditus*; Java; illus.).

The female of this species is characterized by the lightly sculptured dorsum, the greatly expanded epigynial plate between setae II and III, and the shallow emargination of the posterior margin of the sternal projection. The anal plate is about as long as wide, sculptured as figured, and rounded anteriorly, fitting closely into the

strongly concave posterior margin of the epigynial plate; the adanal setae are long and slender, reaching the base of the postanal seta, and located laterad to the posterior margin of the anal opening. The venter has 6-8 pairs of short and 3 pairs of long slender setae.

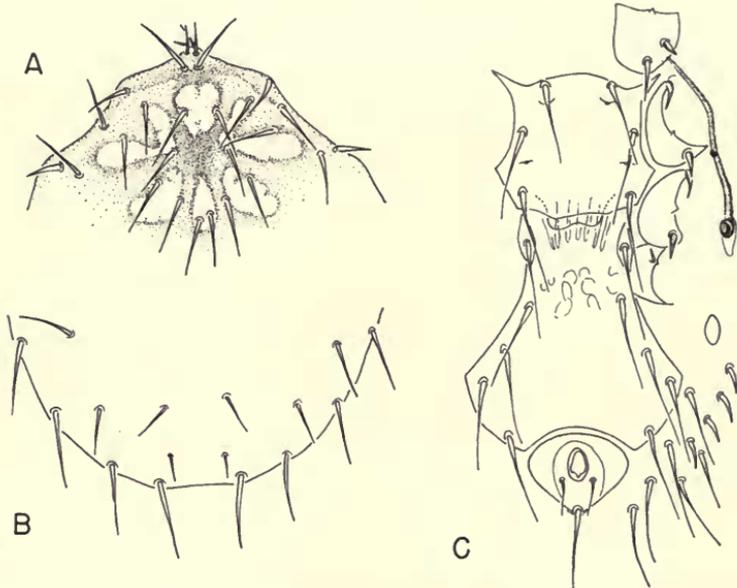


FIG. 32. *Echinolaelaps ornatus*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

*Specimens examined*.—Visayas: Basey, Samar, September, 1945, 9 females, ex *Rattus norvegicus norvegicus* Berkenhort.—Mindanao: Malasila, Kidapawan, Cotabato, December 2, 1946 (F. G. Werner), 23 females, ex *Rattus* sp. On the eastern slope of Mount Apo, 2800 ft. elevation, Davao, October 18, 1946 (G. Alcasid), 4 females, ex *Rattus everetti*. Tagum, Davao, October 10, 12, 14, 1946 (F. G. Werner and H. Hoogstraal), 9 females, ex *Rattus mindanensis*.—Palawan: Calamianes Island Group, Siuk, Culion Island, April 7, 1947 (M. Celestino), female, ex *Sciurus culionensis* Sanborn.

***Echinolaelaps ornatus***, new species. Figure 32, A-C.

The characteristic sculpturing of the dorsal plate, the long, heavily sclerotized sternal plate, and the greatly expanded epigynial plate laterad of setae III readily distinguish this species.

**FEMALE**: All gnathosomal and hypostomal setae short; epipharynx with groove; pilus dentilis short, pointed apically; chelae toothed. Dorsal plate 1160  $\mu$

long, 827  $\mu$  wide, heavily sclerotized anteriorly, sculptured as figured; marginal setae longer and stronger than medial setae. Sternal plate heavily sclerotized, longer than wide; anterior margin slightly rounded, the posterior median projection bilobed; anterior pores arched, posterior pores straight; sternal setae III and metasternals subequal in length. Epigynial plate greatly expanded, angled laterad of setae III, posterior margin strongly concave; distance between setae IV much greater than distance between setae I. Anal plate wider than long, anterior margin rounded, very narrowly separated from epigynial plate; adanal setae laterad to posterior margin of anal opening, slender and reaching base of postanal seta. Venter with 6 pairs of long and 4 pairs of short, strong setae adjacent to epigynial and anal plates. Metapodal plates small, oval. Peritreme barely reaching anterior margin of coxa I. All coxal setae spinelike.

MALE: Unknown.

*Holotype*.—Female, ex *Chiropodomys calamianensis*. Puerto Princesa, Palawan, April 14, 1947 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Paratypes*.—Four females, same data as holotype. One in the United States National Museum collection.

***Echinolaelaps grandis*, new species.** Figure 33, A–C.

The epigynial plate, which is expanded immediately posterior to setae I, and in which the sides are parallel to beyond setae III, and

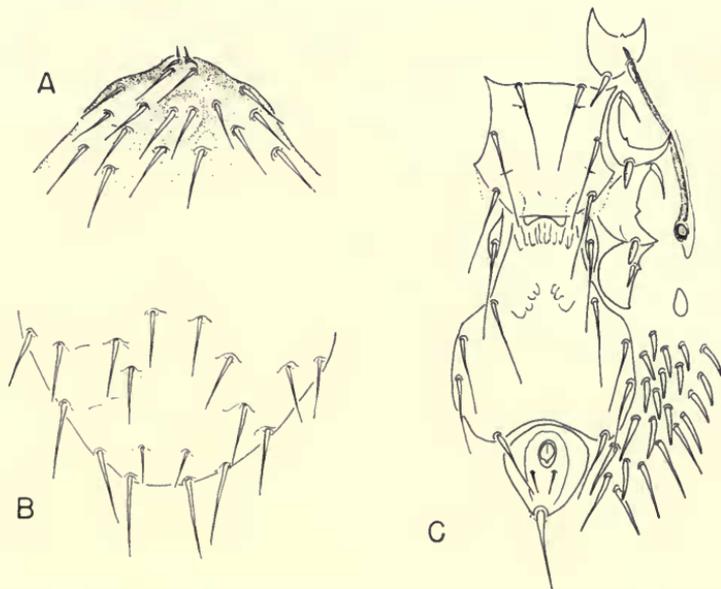


FIG. 33. *Echinolaelaps grandis*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

the short adanal setae located behind the posterior margin of the anal opening will readily distinguish this species.

**FEMALE:** Gnathosoma with posterior medial hypostomal setae long, about 5 times as long as gnathosomal setae; epipharynx with groove; chelae toothed; pilus dentilis slender, with bent, knobbed apex. Dorsal plate 1213  $\mu$  long, 800  $\mu$  wide, well sclerotized, sculptured as figured; setae strong and long except for two small, short pairs of vertical and a pair of submarginal posterior setae. Sternal plate longer than wide, the anterior margin almost straight, the posterior median projection strongly bilobed; anterior pores slightly arched; all sternal and metasternal setae strong, subequal in length. Epigynial plate expanded immediately posterior to setae I, the sides parallel to beyond setae III, the posterior margin strongly concave; the distance between setae IV equals the distance between setae I. Anal plate longer than wide, the anterior margin rounded, with characteristic sculpture, very narrowly separated from the epigynial plate; adanal setae small, short, not reaching the base of the postanal seta, and located below the posterior margin of the anal opening. Metapodal plates small, pyriform. Venter with 7-8 pairs of short, stout, blunt setae laterad to the epigynial plate. Peritreme extending to anterior margin of coxa I. Spinellike setae on coxae I, II and III stout, blunt.

*Holotype.*—Female, ex *Rattus panglima* Robinson. San Pedro, Culion Island, March 30, 1947 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Paratypes.*—Five females, same data as holotype.—Palawan: Calamianes Island Group, Siuk, Culion Island, April 8, 1947 (M. Celestino), 4 females, ex *Rattus panglima* Robinson. Puerto Princesa, April 8-9, 1947 (H. Hoogstraal), 2 females, ex *Rattus panglima* Robinson. Calamianes Island Group, Dimanianga, Busuanga Island (H. Hoogstraal), female, ex *Rattus panglima* Robinson. One in the United States National Museum.

***Echinolaelaps insignis***, new species. Figure 34, A-C.

The drop-shaped epigynial plate with the slightly concave posterior margin, and the wider distance between the anal and epigynial plates readily separate this species from other *Echinolaelaps*.

**FEMALE:** Median posterior pair of hypostomal setae about as long as gnathosomal setae; epipharynx with ventral groove; pilus dentilis short, pointed apically; chelae toothed. Dorsal plate 892  $\mu$  long, 613  $\mu$  wide, very lightly sculptured; two pairs of vertical setae shorter than most marginal and medial setae, posterior submarginal pair very short, not reaching posterior margin of dorsum. Sternal plate slightly longer than wide, posterior median projection bilobed; anterior pores straight, posterior pores angled; sternal and metasternal setae strong, subequal in length. Epigynial plate drop-shaped, posterior margin slightly concave; the distance between setae IV the same as the distance between setae I. Anal plate longer than wide, widely separated from epigynial plate; adanal setae long, strong, and located below anal opening. Venter with 10 pairs of short, strong setae, and

4-5 pairs of long setae laterad to epigynial and anal plates. Metapodal plates elongate oval, twice as long as wide. Peritreme reaching middle of coxa I. Coxae I, II and III each with spinelike setae.

MALE: Unknown; three males included in the series were found on the same host but they are not described here.

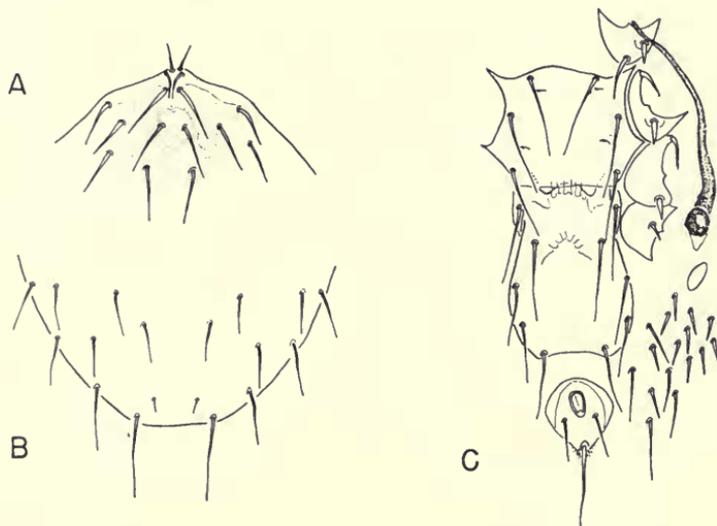


FIG. 34. *Echinolaelaps insignis*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

*Holotype*.—Female, ex *Rattus panglima* Robinson. Tigoplan, Brooke's Point, Palawan, April 30, 1947 (F. G. Werner). In the Chicago Natural History Museum collection.

*Paratypes*.—Nine females, same data as holotype.—Palawan: Calamianes Island Group, San Pedro, Culion Island, March 29, 1947 (H. Hoogstraal), 20 females, ex *Rattus panglima*. Puerto Princesa, April 10, 1947 (H. Hoogstraal), 7 females, ex *Rattus panglima* Robinson. Calamianes Island Group, Siuk, Culion Island, April 7, 1947 (M. Celestino), 3 females, ex *Rattus panglima* Robinson. One in the United States National Museum.

#### Genus HAEMOLAEELAPS Berlese, 1910

*Haemolaelaps bibbyi* Strandtmann and Hunt. Figure 35, A-C.

*Haemolaelaps bibbyi* Strandtmann and Hunt, 1950, Proc. Ent. Soc. Wash., 52, (2), p. 85 (male, female, deutonymph, ex *Rattus frugivorus*; Samar; illus.).

The female of this species is readily distinguished by the structure of the gnathosoma, the large metapodal plates, and the dorsal setae

which are minute medially, long and serrate along the margin of the plate. The sternal plate is wider than long and has the usual 3 pairs of setae. The epigynial plate is greatly expanded, with a nearly straight posterior margin; the paired setae II, III and IV are

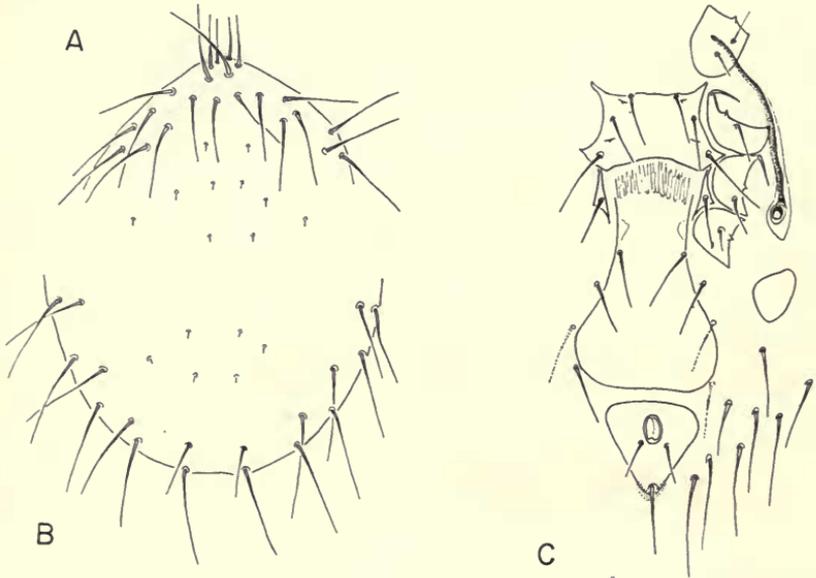


FIG. 35. *Haemolaelaps bibbyi*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

outside the plate. The anal plate is triangular and narrowly separated from the epigynial plate; the adanal setae are posterior to the anal opening and reach the base of the postanal seta. The ventral setae adjacent to the epigynial and anal plates are long and serrate.

*Specimens examined*.—Mindanao: Eastern slope of Mount Apo, 2800 ft. elevation, October 27, 1946 (H. Hoogstraal), 2 females, ex *Rattus everetti*.

#### Family HAEMOGAMASIDAE Oudemans, 1926

##### Genus *Haemogamasus* Berlese, 1889

#### *Haemogamasus quadrisetatus* Vitzthum. Figure 36, A–D.

*Haemogamasus quadrisetatus* Vitzthum, 1926, *Treubia* 8: 52 (female, ex *Mus lepturus*; Java; illus.); Asanuma, Jameson, and Sekikawa, 1952, *Misc. Rept. Res. Inst. Nat. Res.*, no. 26, p. 71 (female, ex *Apodemus speciosus* (Pallas), *Urotrichus talpoides hondonis* Thomas; Japan; illus.).

The female of this species is characterized by the serrate sternal setae I, the serrate setae on all coxae, and the 3 pairs of long, sinuate setae on the posterior margin of the dorsum. The chelae are long and slender, hyaline; the tip of the movable chela is scoop-like; the

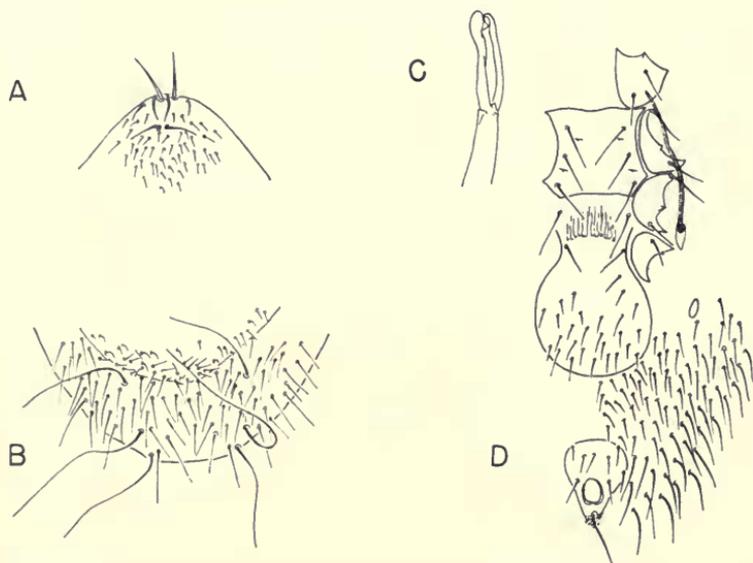


FIG. 36. *Haemogamasus quadrisetatus*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, chelicera; D, venter.

fixed chela is more slender and curved with a hollow tip. The sternal plate is trapezoidal, with the lateral and posterior margins slightly concave. The epigynal plate is broadly rounded posteriorly, with about 38 smooth setae. The anal plate is pyriform, with 6 smooth accessory setae; the adanal setae are smooth and are shorter than the postanal seta; the anal opening is large and is located near the posterior margin of the plate just above the postanal seta. The setae on the venter are numerous, long, and mostly serrate. The dorsal plate is weakly sclerotized, incompletely covering the dorsum. The 3 pairs of posterior dorsal setae are mostly serrate and are unusually long and sinuate.

*Specimen examined*.—Mindanao: Eastern slope of Mount McKinley, 5400 ft. elevation, Davao, August 20, 1946 (H. Hoogstraal), female, ex *Macaca philippinensis mindanensis*.

This is probably a variable species. The description differs from the original one by Vitzthum (1926) from Java, and Asanuma, *et al.*

(1952) from Japan in having 3 instead of 2 pairs of long, posterior setae. Also, Asanuma, *et al.* (1952) pointed out that the Japanese species differs from the Javanese species in having more or less pronounced postero-lateral angles of the epigynial plate, and a posterior median projection on the dorsal plate, both of which are apparently lacking in the Philippine specimen. Except for these differences the Philippine specimen is well in accord with the original description.

Family **DERMANYSSIDAE** Kolenati, 1859

Genus **Steatonyssus** Kolenati, 1858

**Steatonyssus faini**, new species. Figure 37, A, B.

The two subequal dorsal plates with short setae, the thickly sclerotized posterior margin of the sternal plate, and the short peri-

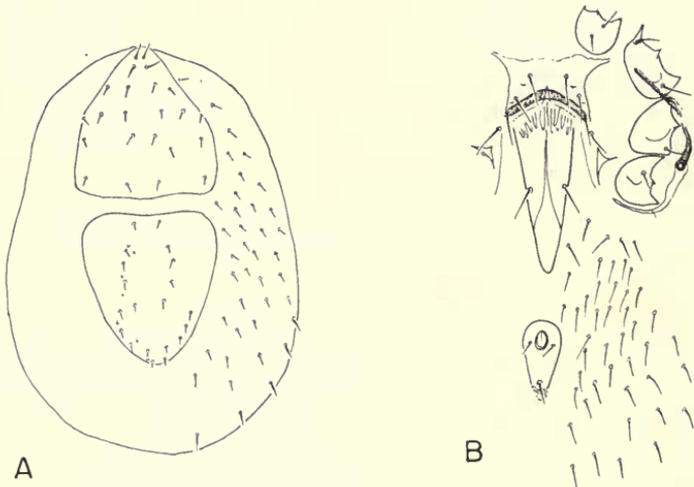


FIG. 37. *Steatonyssus faini*, female: A, dorsum; B, venter.

treme extending to the middle of coxa II are the characteristic features of this species.

**FEMALE:** Chelae slender, tapered apically; first palpal segment with ventral spinelike process. Two subequal dorsal plates, reticulation rather weak; anterior plate 249  $\mu$  long, 236  $\mu$  wide, with 12 pairs of short setae; posterior plate 268  $\mu$  long, 230  $\mu$  wide, with 9-10 pairs of setae. Three specimens in the series, probably unengorged, have larger dorsal plates. Setae on uncovered dorsum numerous, slightly longer than setae of dorsal plates. Sternal plate about twice as long as broad, strongly reticulate, the anterior margin not well defined, the posterior mar-

gin strongly sclerotized, concave; three pairs of sternal setae subequal in length to metasternals. Epigynial plate narrowed posteriorly to a blunt point, the anterior margin with a strong median projection and a pair of moderately long setae. Anal plate elongate pyriform; anal opening near anterior margin of plate; adanal setae laterad to the posterior margin of the anal opening, subequal to the postanal seta. Setae on venter fairly numerous, moderately long and slender. Peritreme short, extending to the middle of coxa II. Coxa II with strong, marginal spur; coxae I, III and IV with long, slender setae.

**MALE:** Very similar to female in most characters except for the following: Holovenral plate divided by a transverse line at the posterior level of coxa IV; lateral margins with projections between coxae I and II, II and III, III and IV; coxa II with a strong marginal anterior spur as in the female. Dorsal plate entire, almost covering the whole body, with a shallow indentation at the middle of the lateral margin. Ventral and dorsal setae stronger than those of the female.

*Holotype*.—Female, ex *Scotophilus temminckii*. Palawan: Cuyo Island, May 28, 1947 (D. Castro). In the Chicago Natural History Museum collection.

*Paratypes*.—Two females, one male, same data as holotype. One in the United States National Museum collection.

*Remarks*.—This species is named in honor of Dr. Alex Fain, Prince Leopold Institute of Tropical Medicine, Anvers, Belgium.

### **Steatonyssus evansi**, new species. Figure 38, A, B.

This species is distinct in having long body setae; there are 10 pairs of long slender setae on the anterior dorsal plate, 3 pairs of long medial setae, and 3 pairs of minute setae on the posterior margin of the posterior plate. The anterior margin of the epigynial plate has a strong, pointed median projection.

**FEMALE:** Chelae slender, tapering toward tip, toothed; first palpal segment with a ventral spinelike process. Dorsal plate divided; anterior plate 319  $\mu$  long, 300  $\mu$  wide, with 10 pairs of long, slender setae; posterior plate narrowed posteriorly, 364  $\mu$  long, 268  $\mu$  wide, with 3 pairs of long and 3 pairs of minute setae on the posterior margin. Setae on the uncovered area fairly numerous, long and slender, those on the posterior margin stronger. Sternal plate about twice as broad as long, the posterior margin thickened, strongly concave, reticulate, the anterior margin indistinct; 3 pairs of sternal setae subequal in length to metasternals. Epigynial plate narrowed posteriorly to a blunt point, the anterior margin with a strong median projection; a pair of long, slender setae on plate. Posterior setae of venter stronger and longer than other setae. Anal plate elongate pyriform; anal opening near anterior margin of plate; adanal setae laterad to the posterior margin of the anal opening, shorter than the postanal seta. Peritreme reaching the margin of coxa I; coxa II with anterior, marginal spur.

**MALE:** Very similar to the female in most characters except for the following: Holovenral plate divided, expanded posteriorly behind coxa IV; anal plate large, elongate pyriform; adanal setae posterior to anal opening. Tibia and tarsus of

leg IV with large, apical spines. Dorsal plate entire, narrowed posteriorly; 6 pairs of medial setae much shorter than the anterior marginal setae; 3 pairs of minute setae on the posterior margin as in the female.

*Holotype*.—Female, ex *Scotophilus temminckii*. Mindanao: Tugunay, Tagum, Davao, November 20, 1946 (D. Castro). In the Chicago Natural History Museum collection.

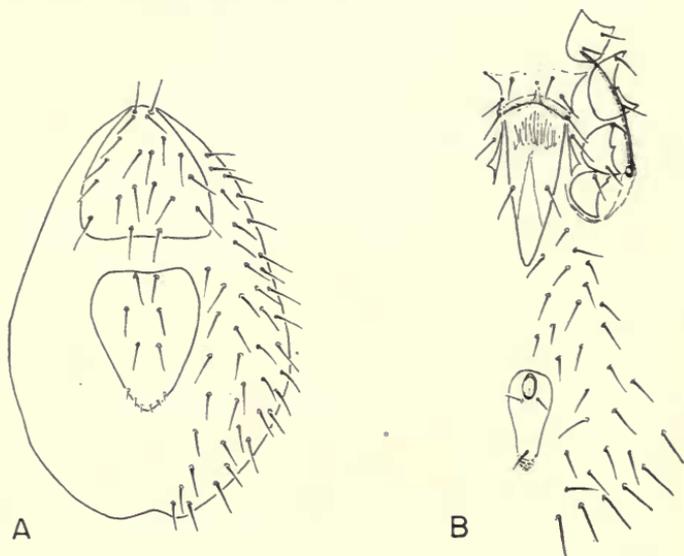


FIG. 38. *Steatonyssus evansi*, female: A, dorsum; B, venter.

*Paratypes*.—One female, one male, same data as holotype. One in the United States National Museum collection.

*Remarks*.—This species is named in honor of Dr. G. Owen Evans, British Museum (Natural History), London, England.

#### Genus *Hirstionyssus* da Fonseca, 1948

*Hirstionyssus apoensis*, new species. Figure 39, A, B.

This species has a narrow sternal plate with concave lateral and posterior margins; the anal plate is broadly oval, and the anal opening is near the anterior margin of the plate; the coxal spur pattern is 0-2-2-1, and tarsus II has a pair of apical clawlike spines.

**FEMALE:** Gnathosomal and hypostomal setae short, subequal; chelae slender, and tapering toward tip. Dorsal plate suboval, 500  $\mu$  long, 268  $\mu$  wide; setae short, subequal. Sternal plate narrow, about three times as wide as long; anterior margin slightly rounded; posterior and lateral margins concave; 3 pairs of setae subequal

in length. Epigynial plate rounded posteriorly, slightly expanded below the epigynial setae; distance between epigynial and anal plates about 1.5 times the length of the anal opening. Anal plate broadly oval; anal opening near anterior margin of plate; adanal setae laterad to posterior margin of anal opening, subequal in length to postanal seta. Venter striate, with 23–25 pairs of short setae. Stigma

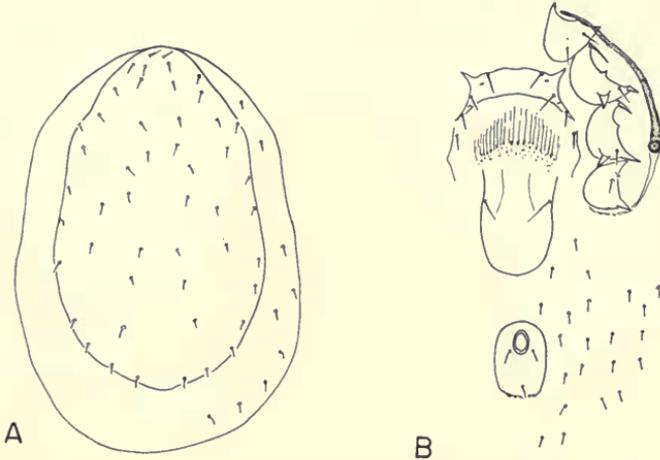


FIG. 39. *Hirstionyssus apoensis*, female: A, dorsum; B, venter.

between coxae III and IV, peritreme reaching anterior margin of coxa I. Coxal spur pattern 0-2-2-1; outer posterior spur on coxa II small, short, inner spur large; two posterior spurs on coxa III large, subequal, sharp; posterior spur on coxa IV small, short. Tarsus II with a pair of clawlike spines at apex.

MALE: Unknown.

*Holotype*.—Female, ex *Rattus everetti*. Mindanao: Eastern slope of Mount Apo, 6400 ft. elevation, Davao, November 8, 1946 (H. Hoogstraal). In the Chicago Natural History Museum collection.

*Paratypes*.—Two females, same data as holotype. One in the United States National Museum collection.

*Hirstionyssus palawanensis*, new species. Figure 40, A, B.

This species is readily distinguished by the rectangular sternal plate, and by the abruptly bent anterior dorsal spur on coxa II. The coxal spur pattern is 0-4-2-1, and the tip of tarsus II has a pair of clawlike spines.

FEMALE: Gnathosomal and hypostomal setae short, subequal; chelae slender, tapered apically. Dorsal plate elongate oval, 524  $\mu$  long, 268  $\mu$  wide; medial and marginal setae minute. Sternal plate rectangular, about 1.5 times as wide as long, the anterior margin rounded, the posterior margin relatively straight. Sternal and

metasternal setae long, subequal in length. Epigynial plate tongue-shaped, expanded below, the posterior margin rounded; distance between epigynial and anal plates two times the length of the anal opening. Venter striate, with more than 25 pairs of long, slender setae. Anal plate longer than wide, the anterior margin rounded; adanal setae shorter than the anal opening, located on the mid-

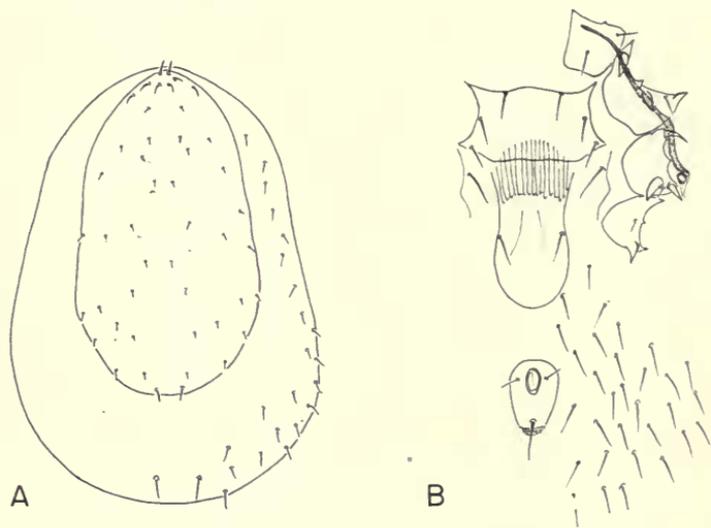


FIG. 40. *Hirstionyssus palawanensis*, female: A, dorsum; B, venter.

line of the opening. Stigma on the posterior margin of coxa III, peritreme extending to the anterior margin of coxa I. Coxal spur pattern 0-4-2-1; dorsal anterior spur on coxa II large, abruptly bent; inner posterior spur of coxa III larger than the outer spur, subequal to the posterior spur on coxa IV. Tarsus II with a pair of apical clawlike spines.

**MALE:** Very similar to the female in most details except for the following characteristics: Holoventral plate not divided, broadest anteriorly with lateral projections between coxae I and II, II and III, III and IV, slightly expanded posterior to coxa IV, then narrowed before anal opening, 8 pairs of subequal, moderately long, slender setae; postanal setae slightly longer than adanal setae. Coxal spurs stronger than in the female, pattern as in the female. Dorsal plate 473  $\mu$  long, 256  $\mu$  wide.

*Holotype*.—Female, ex *Hylopetes nigripes nigripes*. Brooke's Point, Palawan, May 8, 1947 (D. S. Rabor). In the Chicago Natural History Museum collection.

*Paratypes*.—Eleven females, 2 males, same data as holotype; 3 females, male, Puerto Princesa, Palawan, March 15, 1947. One in the United States National Museum collection.

Genus *Ornithonyssus* Sambon, 1928*Ornithonyssus parvus*, new species. Figure 41, A, B.

The small, suboval dorsal plate with about 23 pairs of long setae, the trapezoidal sternal plate, and the small, narrow epigynial plate will serve to distinguish this species.

FEMALE: Gnathosomal setae moderately long, subequal to medial posterior hypostomal setae; chelae strong, not toothed. Dorsal plate small, suboval, narrowing posteriorly, with about 23 pairs of long, slender, subequal setae, 664  $\mu$  long,

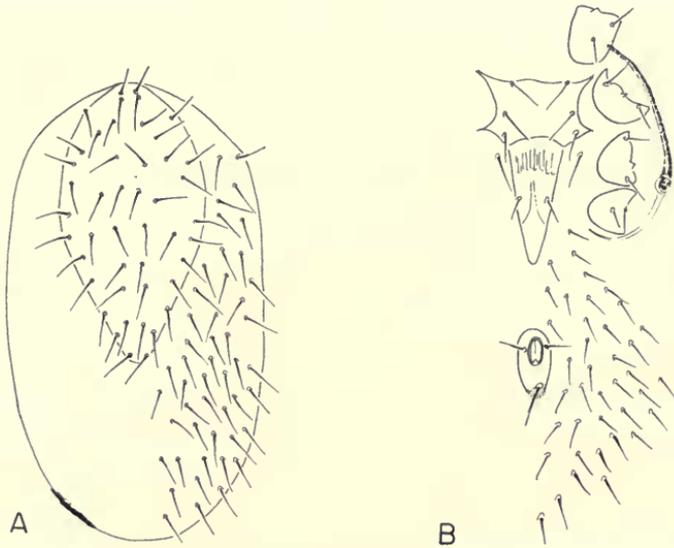


FIG. 41. *Ornithonyssus parvus*, female: A, dorsum; B, venter.

338  $\mu$  wide. Sternal plate trapezoidal, the posterior and lateral margins concave; 3 pairs of setae short, subequal in length. Epigynial plate small, narrow, bluntly pointed posteriorly, with a pair of short setae. Anal plate elongate, about twice as long as wide; anal opening large, near the anterior margin of the plate; adanal setae shorter than the postanal seta and located near the anterolateral margin of the plate. Setae on venter fairly numerous, long and slender, those on the posterior margin much longer and serrate. Peritreme reaching the anterior margin of coxa I. All coxal setae short and slender.

MALE: Similar to female except for the following differences: Chelae strong, tip of fixed chela rounded, slightly bent, and longer than movable chela. Holoventral plate undivided, slightly expanded behind coxa IV, narrowing toward anal plate; 9 pairs (including adanal setae) of moderately long setae subequal in length to the postanal seta. Ventral and coxal setae as in the female. Dorsal plate 568  $\mu$  long, 338  $\mu$  wide; nearly covers the entire dorsum, the posterior lateral margin rugged, irregular in shape, and with a strong median projection; setae stronger and longer than in the female.

*Holotype*.—Female, ex *Thecurus pumilus*. Palawan: Brooke's Point, May 10, 1947 (D. S. Rabor). In the Chicago Natural History Museum collection.

*Paratypes*.—Four females, four males, same data as holotype. One in the United States National Museum collection.

### Genus *Neolaelaps* Hirst, 1926

*Neolaelaps magnistigmatus* (Vitzthum). Figure 42, A–C.

*Liponyssus magnistigmatus* Vitzthum, 1918, Arch. Natg., 84, Abt. A, Heft 6, p. 21 (female, ex *Talpa europaea*; illus.).

The female of this species is readily distinguished by the unusually large stigmata and swollen peritreme running forward onto the dor-

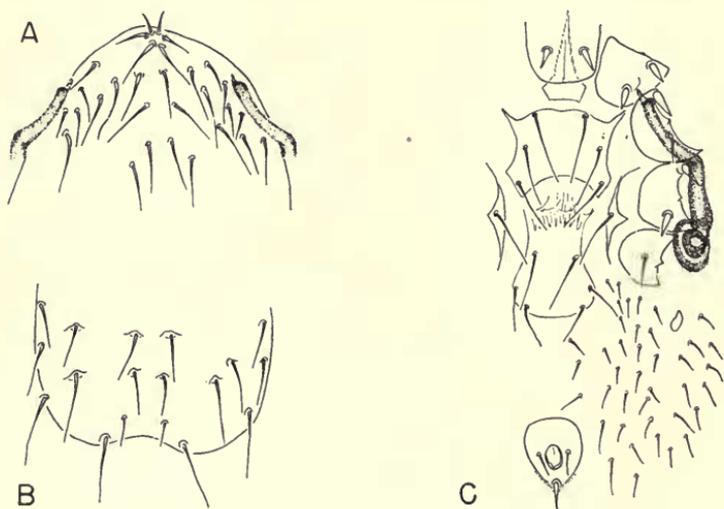


FIG. 42. *Neolaelaps magnistigmatus*, female: A, anterior portion of dorsal plate; B, posterior portion of dorsal plate; C, venter.

sum, by the spinelike setae on gnathosoma and coxae I, II and III, and by the small epigynial plate bearing 3 pairs of setae. The dorsal plate is strongly reticulate and nearly covers the entire dorsum, and the posterior margin has a shallow median excavation. The sternal plate is wider than long, deeply concave at the posterior margin, and bears the usual 3 pairs of setae. The metapodal plates are small and bean-shaped. The setae on the venter are short and slender, and fairly numerous.

*Specimens examined*.—Mindanao: Eastern slope of Mount Apo, 6400 ft. elevation, Davao, November 9 (H. Hoogstraal), 12 females, ex *Acerodon jubatus mindanensis*.—Palawan: Puerto Princesa, April 8, 1947 (H. Hoogstraal), 19 females, ex *Pteropus vampyrus lanensis*. Canon Island, April 17, 1947 (H. Hoogstraal and F. G. Werner), 9 females, ex *Pteropus vampyrus lanensis*.—Mindanao: Eastern slope of Mount Apo, sea level, Lacaron, Davao, February 6, 1947 (F. G. Werner), 5 females, ex *Acerodon jubatus mindanensis*. Tagum, Davao, October 9–10, 1946 (F. G. Werner and A. Castro), 22 females, ex *Acerodon jubatus mindanensis*. Malalag, Santa Cruz, Davao, November 28, 1946 (F. G. Werner), 12 females, ex *Pteropus* sp.

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